Validation of TES CO Profiles Using MOPITT CO Products: A Preliminary Study

Shu-peng Ho, John C. Gille, David P. Edwards, Debbie Mao, Dallas Master and Merritt Deeter

National Center for Atmospheric Research, USA

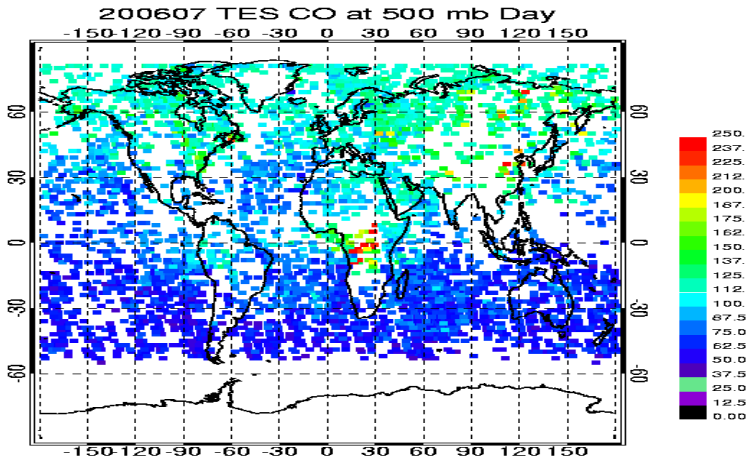
Fig. 1

Motivations

Purpose : to use the MOPITT CO products to quantitatively validate TES CO profiles and understand the possible causes of the differences between these two datasets

Outlines :

- **Difficulties**
- **Comparison Method**
- **Comparison Results :**
  - **1) Global CO distributions**
  - **2) 1x1 grid CO at different levels**
  - **3) Zonal mean comparisons**
- **Conclusions and Future Works**



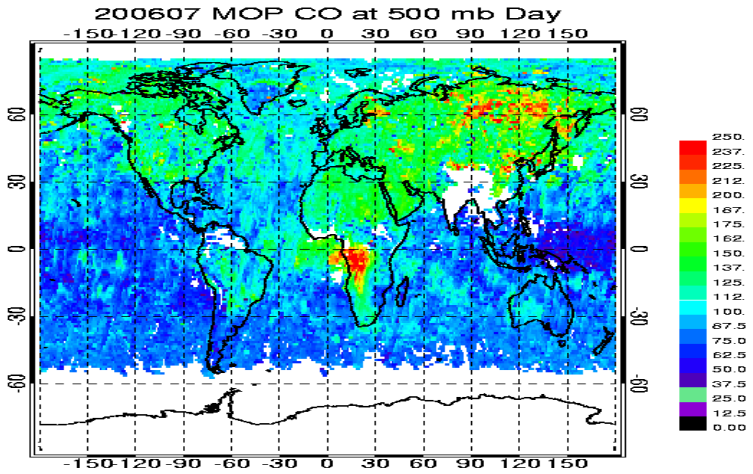


Fig. 2

Comparison Methods

Difficulties:

1. Temporal/spatial sampling
2. Vertical resolution
3. A priori profile
4. Clouds

Comparison Methods:

1. MOPITT pre-V4 CO products
   - Monthly a Priori 4.7 µm Emissivity (Ho et al., 2005)
   - Log(VMR)
2. 1x1 grid MOPITT CO vs. TES CO
3. TES cloud top pressure

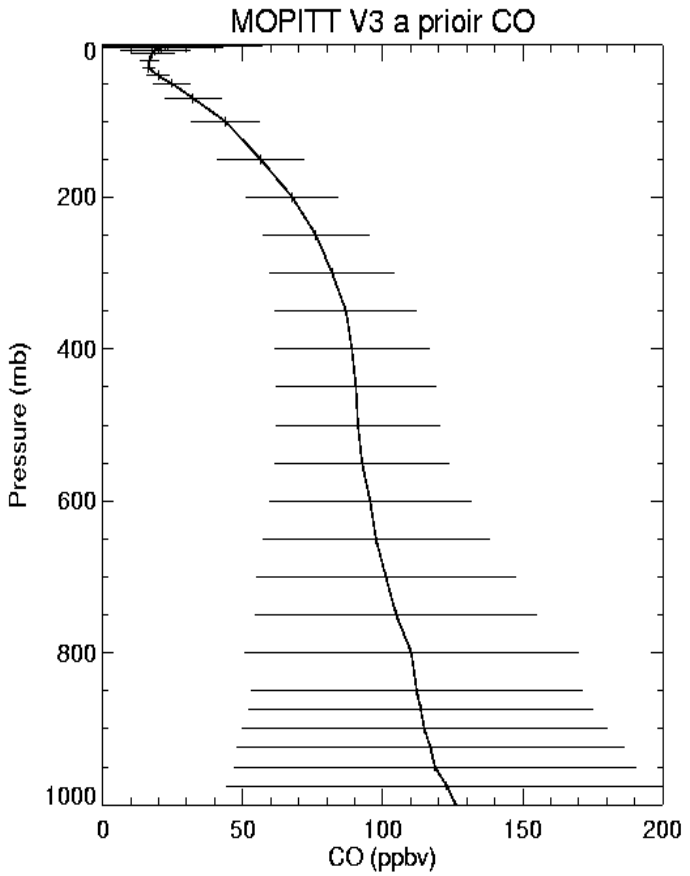


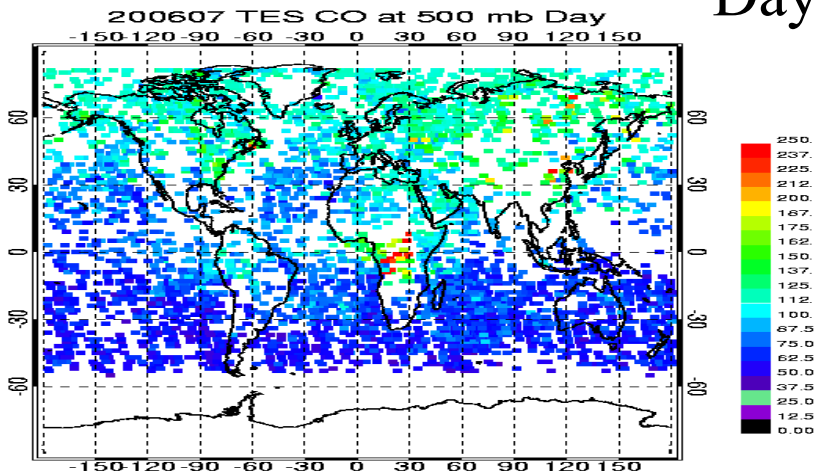
Fig. 3

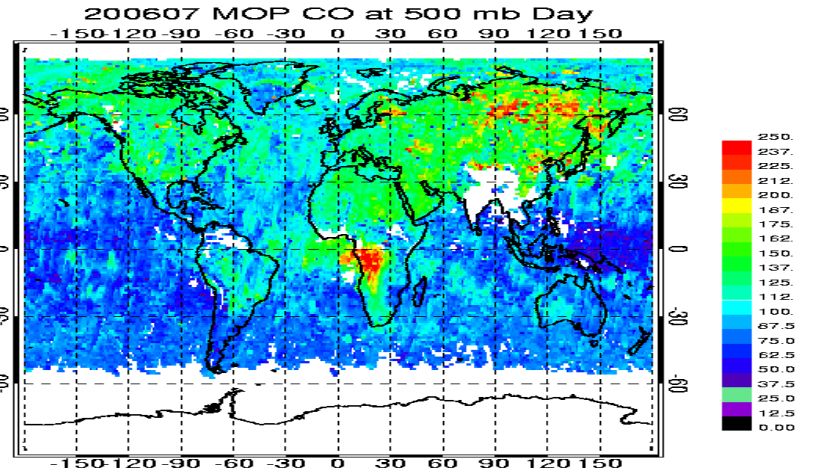
Global CO Distribution for 200607 at 500mb

TES

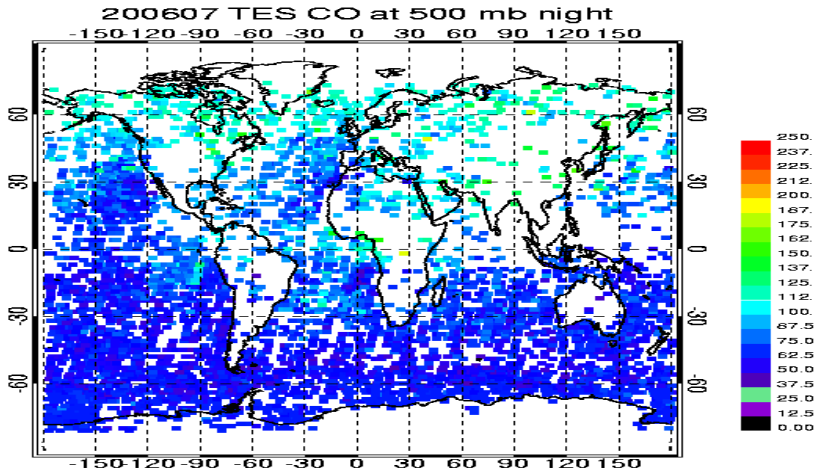
Day Time

MOPITT





Night Time



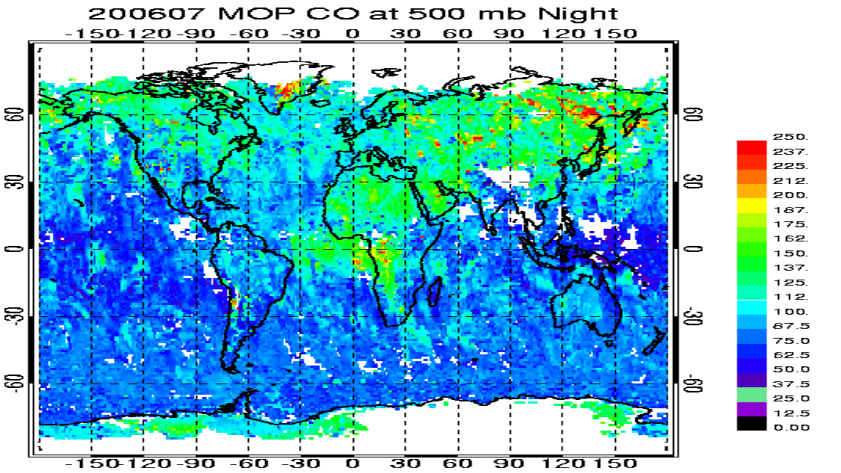
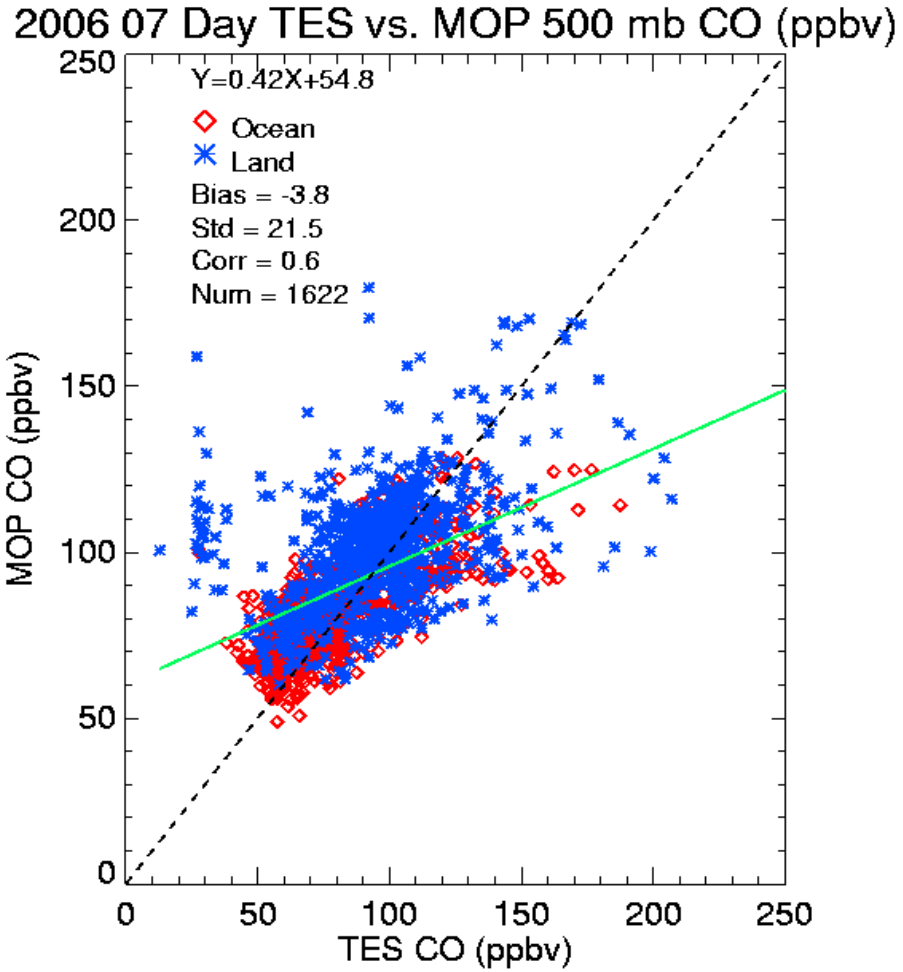
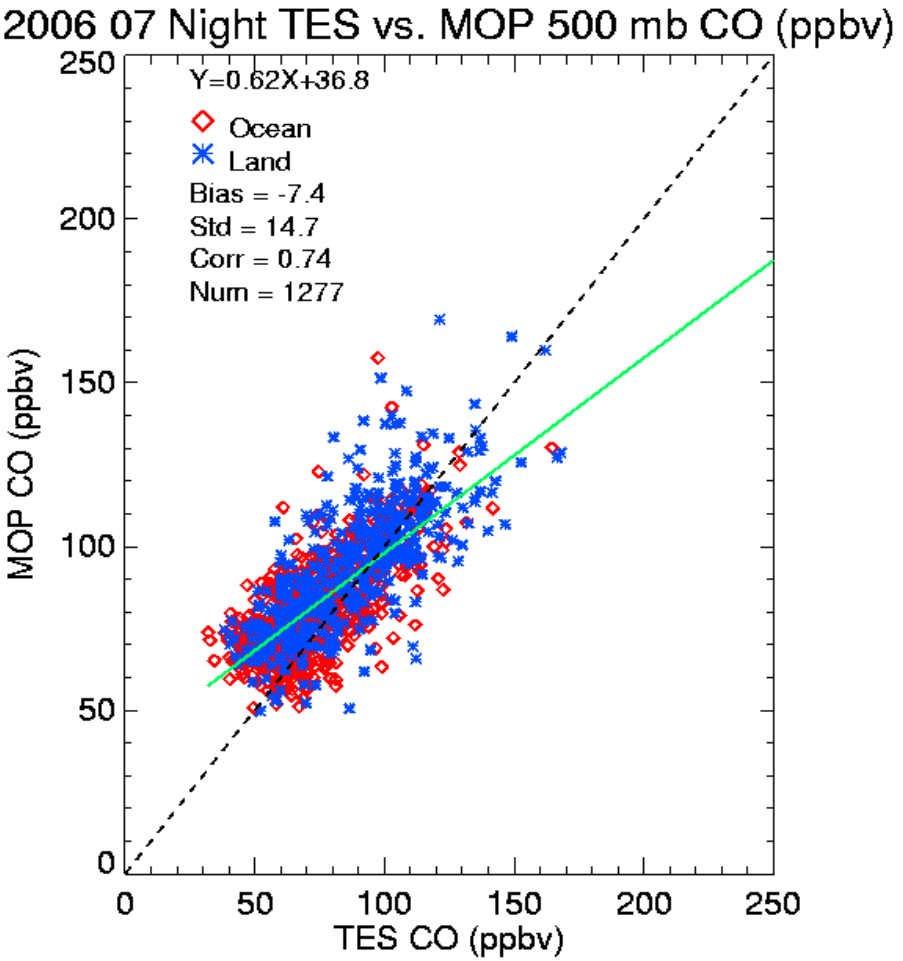


Fig. 4

MOP vs. TES CO in 1x1 Grid at 500mb



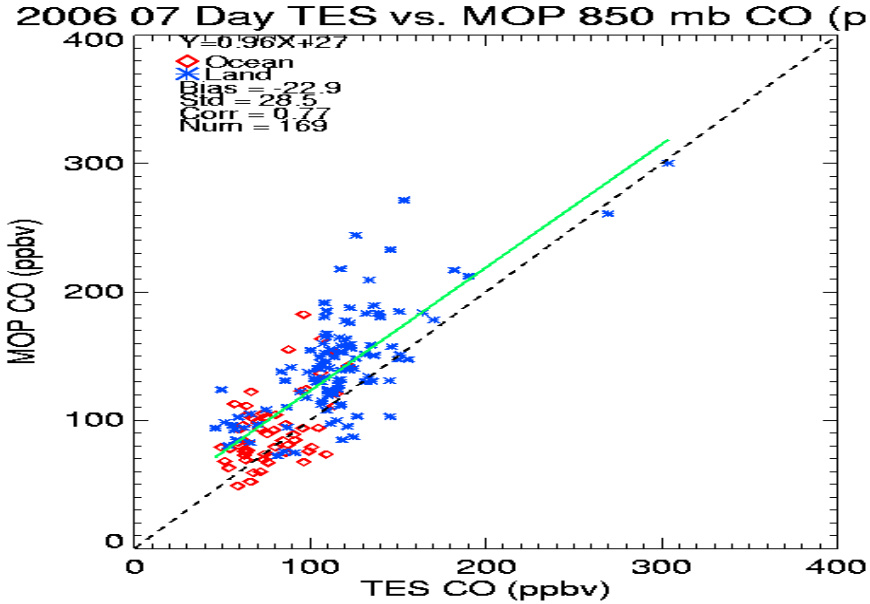
Day

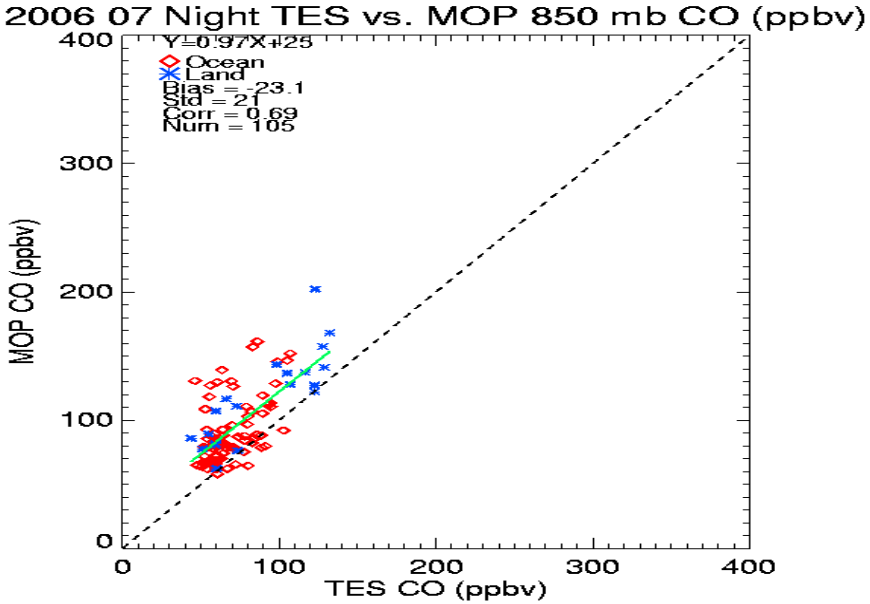


Night

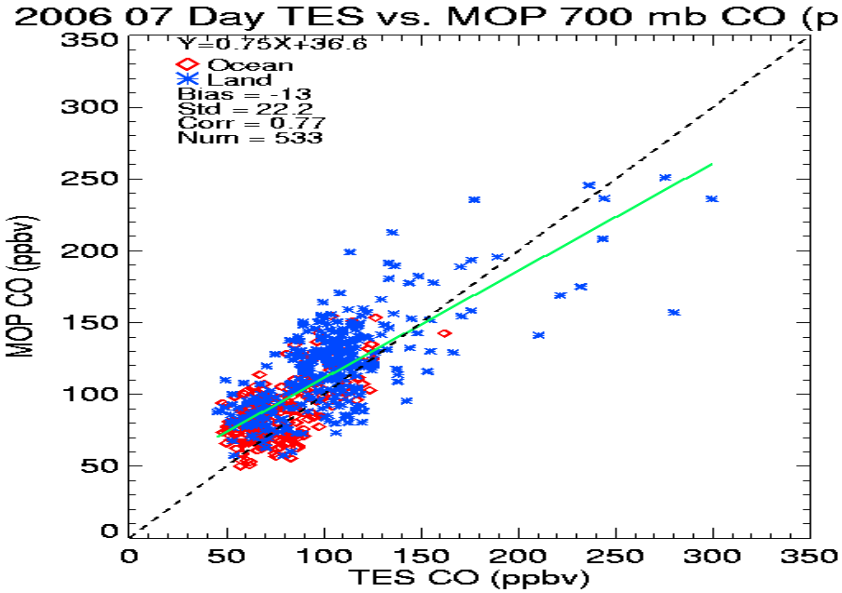
Fig. 5

Day 850mb Night





700mb



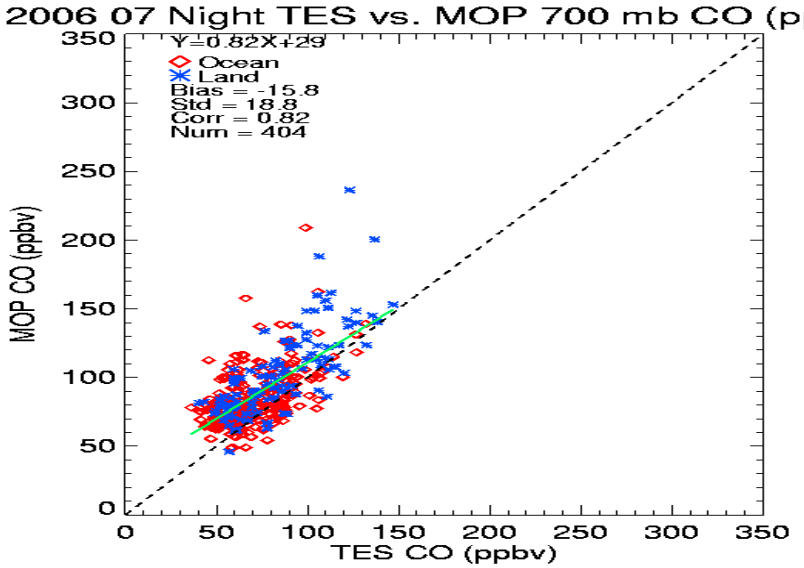
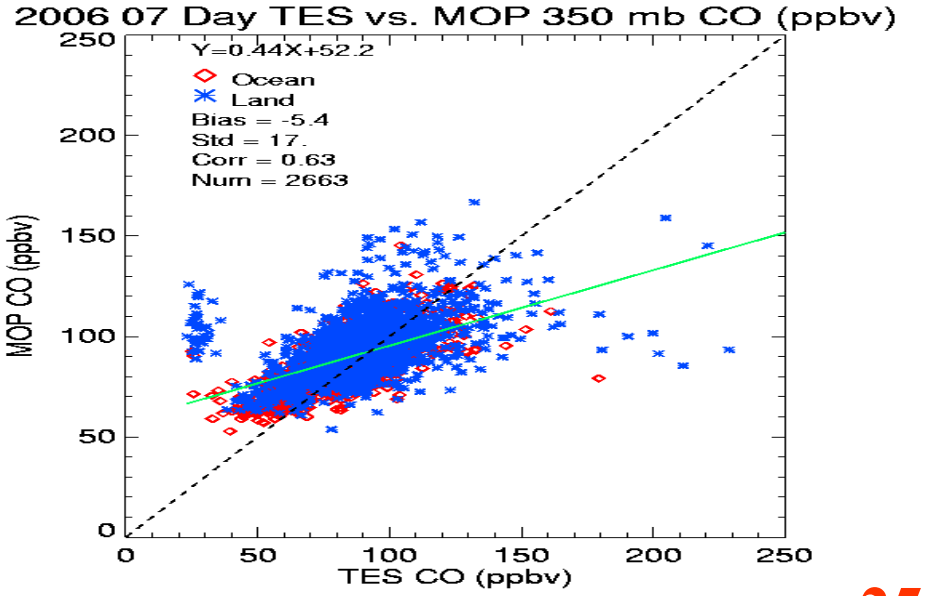
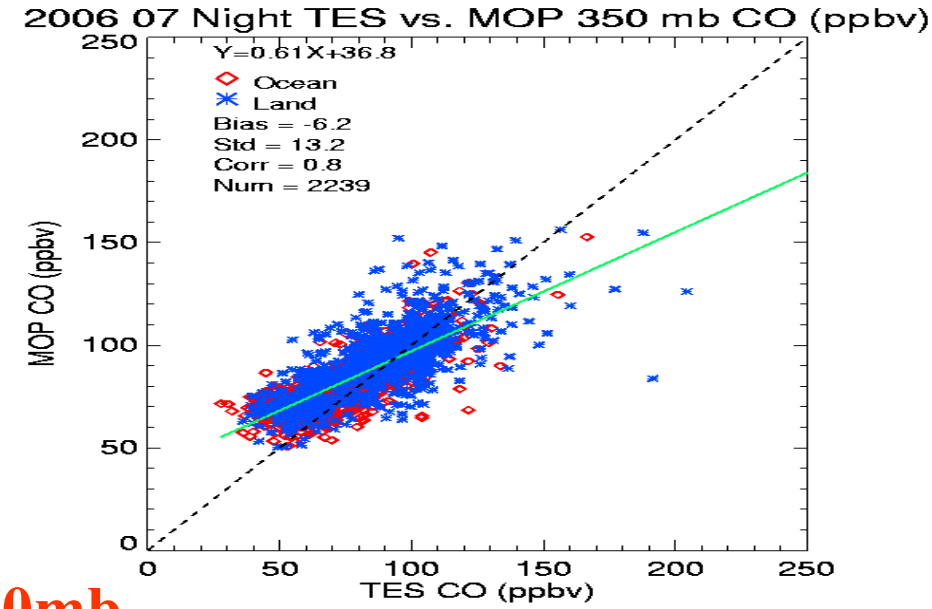


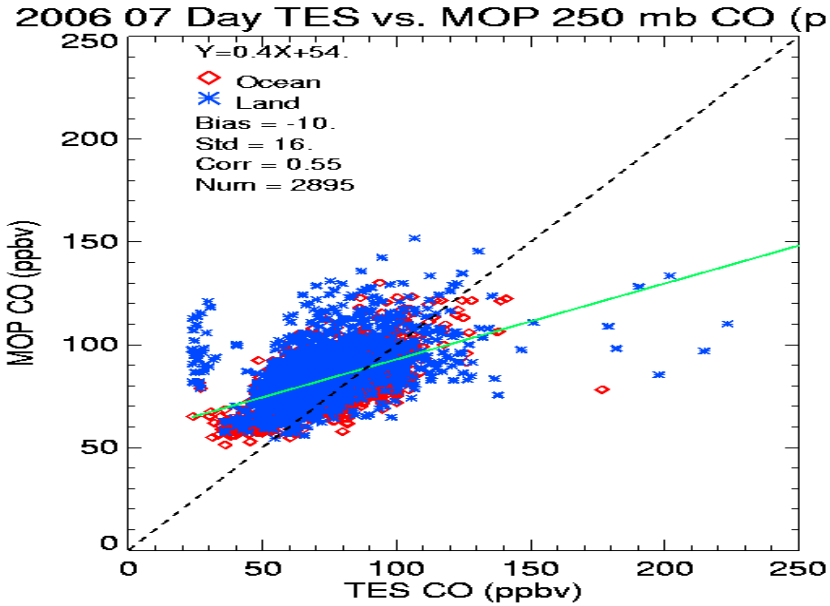
Fig. 6

Day 350mb Night





250mb



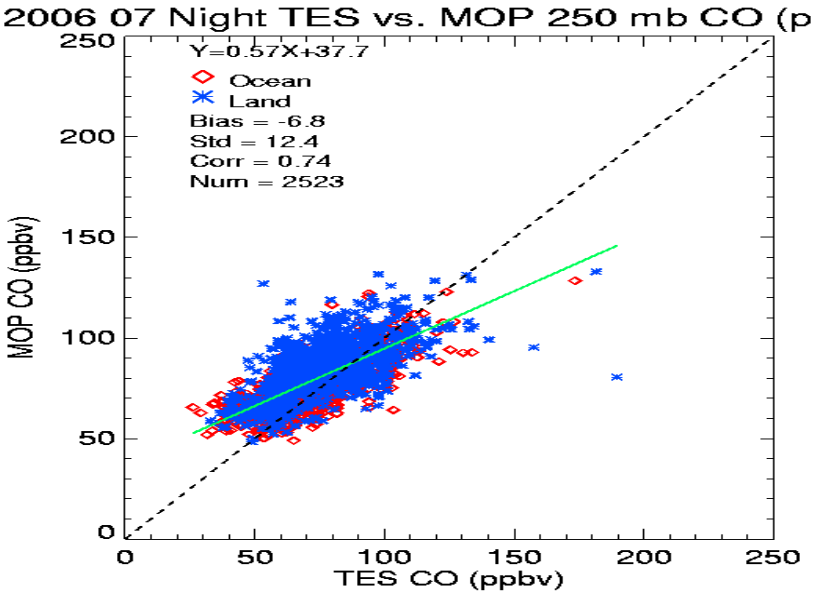


Fig. 7

MOP vs. TES CO Zonal Means

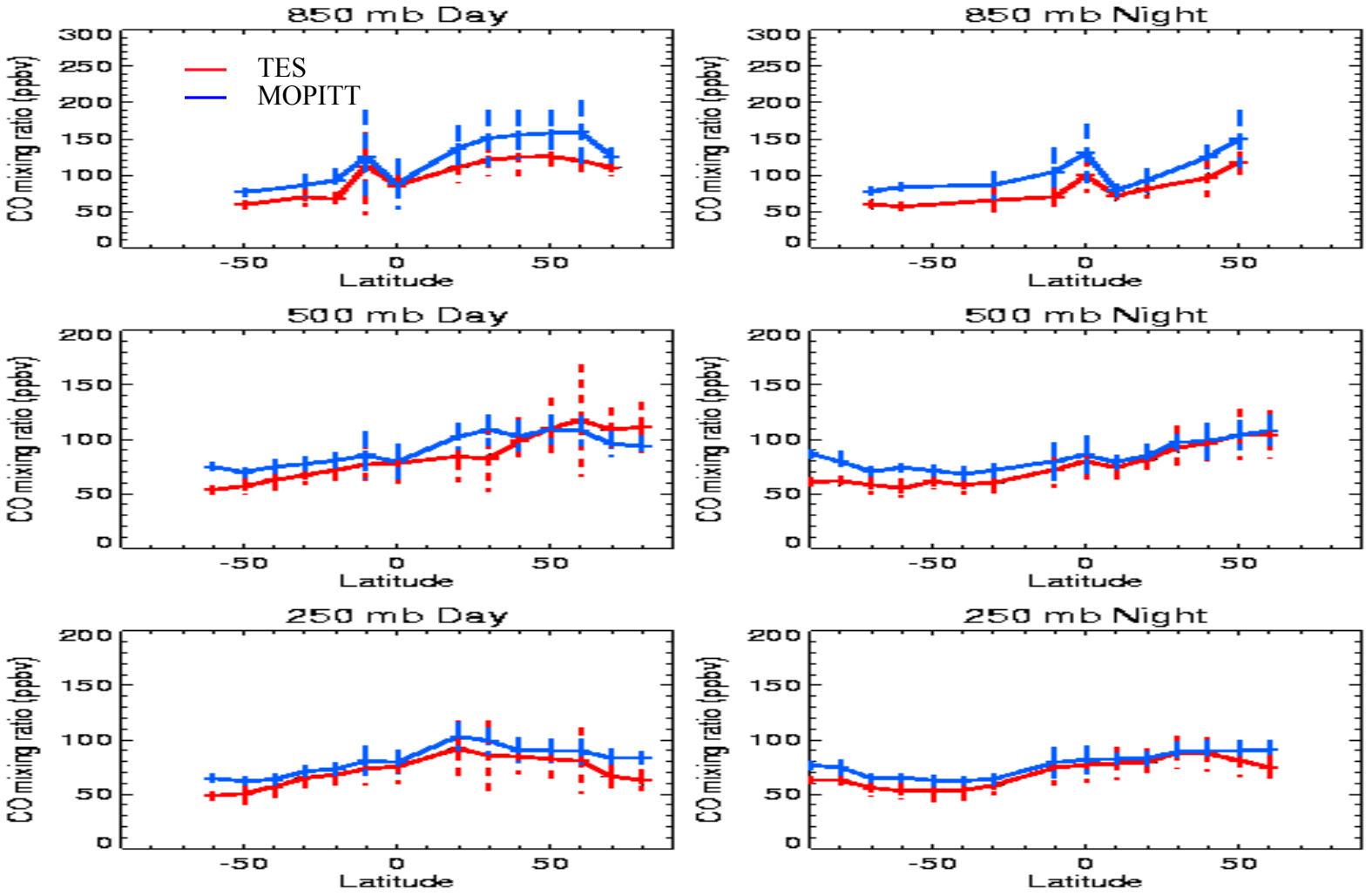
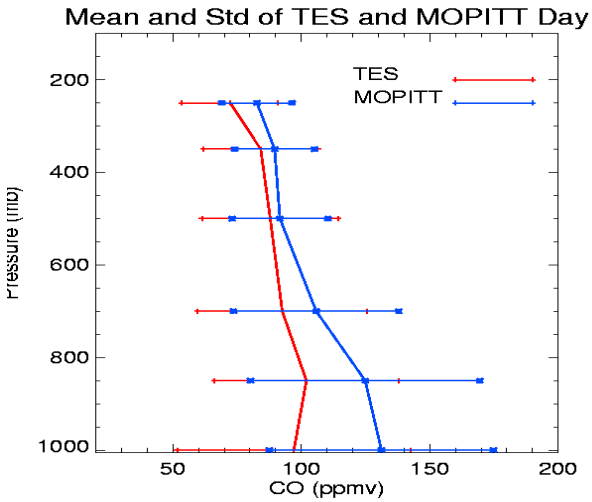


Fig. 8

Conclusions and Future Works

1. The MOPITT and TES CO values depend on their vertical weighting function, which is a function of location and a priori profile
2. In this study, we used 1x1 grid MOPITT CO products to validate TES CO products. Without considering the effect of a priori profile to CO results, TES CO is highly correlated to MOPITT CO at almost all vertical levels.
3. TES CO is consistently lower than MOPITT CO at all vertical level and at different latitudes.
4. In the future, we will need to consider the effects of different averaging kernels (weighting functions, instrument and forward model noises, background covariance and a priori profile) on TES and MOPITT CO products and the effect of clouds.



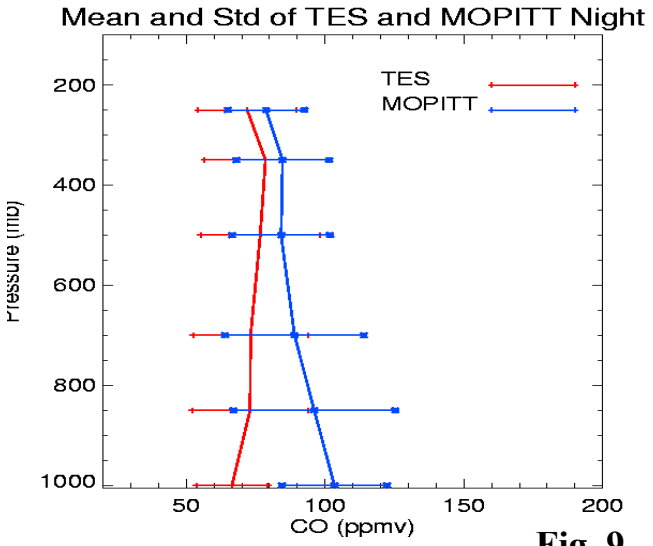


Fig. 9